SALTON SEA UNIT 6

CURE DATA REQUESTS SET ONE (# 1-98)

AIR QUALITY

Background

The construction fugitive dust erosion emissions in Table G-1 were estimated assuming an uncontrolled emission factor of 0.011 tons of PM10 per acre month based on a 1996 MRI report and an 80% control efficiency based on AP-42. These assumptions are inconsistent with sources cited by the applicant and inconsistent with the applicant's proposed mitigation measures in Section 5.1.4. Further, the calculations omit some sources of fugitive dust. The net result appears to be a substantial underestimate of fugitive PM10 emissions during construction.

The fugitive PM10 erosion emissions in Table G-1 were estimated assuming 0.011 tons PM10/acre-month, based on a 1996 MRI report.[1] However, this report recommends an emission factor of 0.11 ton/acre-month (ten times higher)or 0.011 ton/acre-month *plus* additional emissions of 0.059 ton/1,000 yd^3 of on-site cut/fill *plus* 0.22 ton/1,000 yd^3 of off-site cut/fill. The AFC did not use either and thus underestimated fugitive dust erosion emissions.

Data Request

1. Please revise the fugitive dust erosion emissions in Table G-1 to use an emission factor of 0.11 ton/acre-month or to include additional emissions from on-site and off-site cut and fill.

2. If, in response to Data Request # 1, you revise Table G-1 to include on-site and off-site cut/fill, please provide the volume of cut and fill assumed in your calculations and support your estimate with a grading plan.

Background

The fugitive dust erosion emissions in Table G-1 assume a control efficiency of 80%, based on AP-42 (10/01 draft), page 13.2.2-11. However, this control efficiency applies only to unpaved roads on which dust is controlled by applying "chemical dust suppressants" at regular intervals of 2 weeks to 1

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[1] Midwest Research Institute (MRI), Improvement of Specific Emission Factors (BACM Project No. 1), Final Report, March 29, 1996.

month. (AP-42, p. 13.3.3-11.) The AFC has applied this control factor to all fugitive dust emissions, including grading. Chemical dust suppressants applied bi-weekly to monthly are not effective to control dust from areas that are repeatedly disturbed, as by grading. Further, lower control efficiencies have been assumed in other siting cases. Finally, the mitigation measures proposed in section 5.1.4 of the AFC do not include the use of chemical dust suppressants to achieve an 80% control efficiency. Only watering is proposed. Dust control using water in a desert environment would require much more frequent applications of water than the twice daily rate suggested in the AFC at page 5.1-45, potentially resulting in significant water supply impacts.

Data Request

3. Please identify all mitigation measures that will be implemented to achieve an overall 80% fugitive dust control efficiency.

4. Please support the assumed 80% control efficiency with vendor information and/or engineering calculations. If your answer to Data Request # 3 includes watering for dust control, as currently claimed in the AFC on page 5.1-45, please estimate the average annual and maximum daily amount of water that will be required to achieve an 80% control efficiency, using a method such as that in Cowherd et al. (1988).[2] Your answer should include a fully documented engineering calculation that identifies all assumptions, including the water application rate, application frequency, capacity of water trucks, and assumed precipitation and evaporation rates.

Background

The AFC estimates fugitive dust from three sources: erosion emissions in Table G-1, construction worker travel in Table G-1.1, construction delivery trucks in Table G-1.2, and construction equipment in Table G-1.3. The following additional sources of fugitive dust appear to be omitted:

a. Wind erosion - The emission factor of 0.011 ton/acre-month used to estimate erosion emissions (AFC, Table G-1) is based on the 1996 MRI report. This factor does not include wind erosion emissions.

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[2] C. Cowherd, G.E. Muleski, and J.S. Kinsey, Control of Open Fugitive Dust Sources, Report EPA-450/3-88-008, September 1988.

b. Stockpiles - Fugitive PM10 emissions are generated by wind erosion of open storage piles. Several stockpiles would be present at the various construction sites. Topsoil storage piles, for example, would be required for construction of the generation facility and linear facilities. Further, temporary storage piles are commonly used to balance cut and fill. The fugitive emission calculations do not include any fugitive PM10 emissions from these piles. The EPA has developed procedures (AP-42, § 13.2.5) and a model to estimate these emissions. Construction emissions should be revised to include wind erosion of stockpiles.

c. Drop Emissions - Drop operations, such as adding material to a storage pile, removing material from a storage pile, loading material onto a truck bed, dumping material from an excavator, etc. generates substantial amounts of PM10 during mass grading. These emissions are not included in the 0.011 ton/acre-month emission factor used in the AFC. They can be readily estimated using procedures developed by the EPA for storage piles (AP-42, § 13.2.4) and mining (AP-42, § 11.9).

d. Mud/Dirt Carryout - Mud and dirt on the tires and bodies of equipment leaving the construction site are deposited on adjacent paved roads. This increases the surface loading of dust, which is entrained by passing vehicles. These emissions can be substantial, if not controlled using street sweeping. A recent study found that mud/dirt trackout from an active construction site increased PM10 emissions from every vehicle passing over the affected roadway by roughly 6 grams.[3] These emissions were not included in the construction emission inventory and should be added.

Data Request

5. Please estimate fugitive emissions from each of the following sources: wind erosion, stockpiles, drop emissions, and mud/dirt carryout, or explain why they are excluded.

Background

The well drilling rig emissions in Table 5.1-18 are based on calculations in Table G-2. The emission calculations are based on emission factors for a Caterpillar 3214DITTA engine. These emission factors are lower

[3] Gregory E. Muleski and Andrew E. Page, Characterization of PM Emissions from Mud / Dirt Carryout, Proceedings of the Air &Waste Management Association's 94th Annual Conference & Exhibition, June 24-28, 2001.

than the EPA Tier 3, 2006 nonroad diesel engine standards and could only be met by new engines.

Data Request

6. Please provide a copy of the Caterpillar emission guarantee for this engine.

7. Does the applicant propose to use drill rigs equipped only with these low-emission Caterpillar engines?

8. If the answer to Data Request # 7 is yes, is the applicant willing to accept a COC requiring only Caterpillar 3214DITTA engines that met the emission factors assumed in Table G-2?

9. If the answer to Data Request # 8 is no, please (a) provide all justification for your answer and (b) revise the emission calculations in Table G-2 and the dispersion modeling in Tables 5.1-38 through 5.1-84 to use the emission factors in AP-42, Table 3.4-1.

Background

The well drilling modelling scenario assumes a rig engine would have a stack height of 14 feet, a stack diameter of 8 inches, exhaust gas flow rate of 2,340 acfm, and a stack velocity of 114 ft/sec.

Data Request

10. Please provide all vendor information that supports the stack diameter and exhaust gas flow rate.

11. Exhaust stacks on drill rigs are commonly horizontal. If vertical, they are equipped with a rain cap. The net result is a low exit velocity and very little plume rise. Please provide all information you have on the rigs that will be used that supports a 14 foot high vertical stack with plume rise, as assumed in the dispersion modeling.

12. If the stack in Data Request # 11 is vertical, will it be equipped with a rain cap?

13. If the answer to Data Request # 12 is yes, please explain how the cap was simulated in the dispersion modeling.

14. Will the applicant be willing to accept a COC that requires the use of drill rigs equipped with four 450-hp engines, each with a 14-foot high, 8-inch diameter stack and exhausting at the rate and under the conditions assumed in the dispersion modelling?

15. If the answer to Data Request # 14 is no, please (a) provide all justification and (b) revise the modeling to use engine characteristics consistent with those that will be actually used.

Background

The well drilling emissions in Table G-2 (and Table 5.1-18) appear to be inconsistent with the description of well drilling at pages 3-37 and 5.1-12. Drilling is described as taking place 24 hours per day for an average of 61 days per well, while the per-well emissions in Table G-2 are based on roughly half this amount of drilling. For example, Table G-2 indicates that 25.97 lb/hr of NOx would be emitted from drilling a single well. Assuming drilling takes place 24 hr/day for 61 days, the total NOx would be 19 tons, compared to 8.4 ton reported in Tables 5.1-18 and Table G-2.

Data Request

16. Please resolve the apparent discrepancy between the emissions in Table G-2 and the description of well drilling at pages 3-37 and 5.1-12.

Background

The construction car and truck emissions in Table G-3 and delivery truck emissions in Table G-3.6 are based on emission factors from EMFAC2000 Version 2.02 default scenario for the Salton Sea Air Basin, year 2002. The version of EMFAC that was used by the AFC is two versions out of date. The most recent version is EMFAC2002 v2.2. The most recent version estimates higher emission factors than used in Table G-3.

Data Request

17. Please clarify whether these emissions are for on-site vehicles.

18. Please (a) revise the emission calculations to use the most recent version of EMFAC, or (b) justify the use of an outdated model.

19. For the car, pickup truck, dump truck, fuel truck, water truck and flatbed truck, please disclose the assumptions that were used in running EMFAC2000:

    (a) Identify the type of vehicle (LDA, LDT1, LDT2, MDV, LHD1, LHD2, MHD, etc.);

    (b) Identify the controls (cat, noncat) assumed for each type of vehicle;

    (c) Identify the specific conditions and vehicles speed that you assumed for each vehicle and vehicle type; and

    (d) Justify each of your choices in subparts (a) - (c).

20. The construction vehicle emission calculations assume 11.5 miles per day for cars and pickup trucks, 20 mi/day for the water truck, and 2.5 mi/day for other vehicles. These estimates appear to be low, given the size of the site. Thus, please explain the basis, justify these choices, and identify whether these are round trip miles.

21. Note 5 to Table G-3 indicates that mileage is based on estimated "on site travel distances." Please confirm that these vehicles would remain on-site throughout the duration of construction. If not, please clarify whether off-site travel distances are included in these estimates or elsewhere.

22. The vehicle (cars, trucks) emission rates in lb/hr in Table G-3 appear to be lb/day, rather than lb/hr. Please verify the units and revise as appropriate.

23. The number of pieces of equipment assumed in the monthly vehicle emissions in Table G-3.1 are inconsistent with the construction equipment usage reported in Table 3.4-2. Please (a) explain the inconsistency and (b) revise these emissions as appropriate

24. Emission factors for on-road trucks are used for the dump trucks. Normally, dump trucks are off-road vehicles and off-road emission

factors are used due to differences in duty cycles. Please provide all justification for using on-road emission factors for the dump trucks.

Background

Non-exhaust emissions account for a substantial portion of the VOC emissions from off-road equipment, and for certain engine types, the non-exhaust component is comparable to the exhaust component. The bulk of these non-exhaust emissions come from evaporative emissions[4] and refueling losses.[5] Evaporative losses include diurnal, hot soak, and crankcase emissions. Evaporative emissions are losses from the fuel tank while the engine is not in use due to daily ambient temperature changes. Hot soak emissions are gasoline vapors generated immediately following shutdown of an engine due to vaporization of fuel remaining in the carburetor float bowl as it is warmed by residual engine heat. Most of the construction equipment used at the site would be refueled at the site and stored at the site. Thus, evaporative emissions should have been included in the construction equipment emission inventory, but apparently were not. Diurnal losses, for example, are 3.0 to 4.0 grams per gallon per day. These emissions can be estimated from the 1991 EPA NEVES report[6] and more recent EPA guidance.

Data Request

25. Please provide an estimate of evaporative and refueling emissions and support your estimate with references and engineering calculations.

Background

The emission factors, engine hp, and load factors used to estimate emissions from off-road construction equipment in Table G-3 are based on the SCAQMD CEQA Handbook, Table A9-8-B. The SCAQMD CEQA Handbook contains two tables of emission factors, Table A9-8-A and Table A9-8-B. The AFC relied on the latter. However, the former includes the following note: "As much as possible use the following emission factors from Table A9-8-A. If these emission factors cannot be applied to your project then only use emission factors provided in Table A9-8-B." (p. A9-82.) The AFC only relied

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[4] Craig A. Harvey, U.S. EPA, Office of Mobile Sources, Basic Evaporative Emission Rates for Nonroad Engine Modeling, February 13, 1998.
[5] Gary J. Dolce, U.S. EPA, Office of Mobile Sources, Refueling Emission for Nonroad Engine Modeling, August 20, 1998.
[6] U.S. EPA, <u>Nonroad Engine and Vehicle Emission Study -- Report</u>, November 1991.

on Table A9-8-B, even though many of the factors in Table A9-8-A apply, e.g., those for lifts, dozers, graders, and loaders. Most of the emission factors in Table A9-8-A are higher than those relied on in the AFC.

Data Request

26. Please provide all justification for using emission factors that are lower than those recommended by the SCAQMD CEQA Handbook that was relied on, or revise the off-road construction emissions to use the correct factors.

Background

Half of the engine hp values used in Table G-3 to estimate off-road construction emissions are based on default values from the SCAQMD CEQA Handbook, Table A9-8-C, rather than actual values for the equipment that would be used to construct the project. These values are based on nationwide averages used by the EPA to develop nonroad emission inventories and are generally lower than the engine hp of equipment that would actually be required to construct the project.

Data Request

27. Please provide all justification for using these average values, or revise the off-road emissions to use the ratings of equipment that will actually be used.

Background

The PM10 emission factors used to estimate off-road construction emissions, although consistent with the SCAQMD Handbook, are roughly half of those recommended by the U.S. EPA in the Nonroad Engine and Vehicle Emission Study (11/91). The lower SCAQMD emission factors are likely based on the use of CARB diesel in the SCAQMD.

Data Request

28. Please provide all justification for using lower PM10 emission factors than recommended in the U.S. EPA Nonroad Engine and Vehicle Emission Study (11/91).

29. If the lower PM10 emission factors assume the use of CARB diesel, is the applicant willing to accept the use of only CARB diesel as a COC?

Background

The notes to Table G-3 indicate that the off-road equipment usage factors are based on "design engineer" estimates. These factors range from 30% for the concrete pump to 90% for the grader.

Data Request

30. Please provide all engineering calculations you relied on that support these factors.

Background

The equipment inventory in Table 3.4-2 and emissions estimated in Table G-3 do not appear to be sufficient to construct the project described in Section 3 of the AFC. Specialized equipment required to construct the following facilities is not included in Table 3.4-2.

Data Request

31. Many types of trucks not included in the equipment inventory in Table 3.4-2 would be required daily to construct the transmission line, including concrete (for footings) delivery trucks, pole delivery trucks, cable/conductor delivery trucks, bucket trucks, drum puller trucks, dual tensioner trucks, and pickup trucks. Further, two cranes working in tandem are required to install a transmission line, a 2-4 ton, 425-hp crane and a 20-ton, 425-hp crane. Some of this equipment is shown on Figure 3.4-1. The AFC does not appear to have included all of the transmission line construction emissions. Please (a) identify all of the equipment that will be used to construct the transmission lines and (b) revise the emission inventory to include this additional equipment.

32. Typical pipeline construction activities include hauling and stringing of the pipe along the route; welding, radiographic inspection and coating of the pipe welds; installing pipe supports; raising the pipe into the aboveground rack;

hydrostatic testing of the pipeline; and cleanup and restoration. These activities would require the following additional equipment: pipe-stringing trucks to transport pipe from the shipment point or storage yard to the pipeline ROW, bending machines to conform the pipe to the terrain, welding trucks and rigs to weld the pipe, side-boom tractors to lift the pipe into the racks, and numerous support equipment including an A-frame truck, coating truck, mechanics rig, a parts van, and x-ray trucks, among others. Thus, the AFC apparently did not include all of the pipeline construction emissions. Please (a) identify all of the equipment that will be used to construct the pipeline and (b) revise the emission inventory to include this additional equipment.

33. Implementing the geotechnical recommendations to accommodate the expansive, weak, liquefable soils found throughout the site, would likely require the import of clean fill, limestone, and other materials that do not appear to be included in the truck estimates. Please (a) identify the equipment that will be used to implement your geotechnical recommendations and (b) revise the emission inventory to include any additional trucks and other material required to implement the recommendations of the geotechnical report.

34. The AFC includes idling emissions for only PM10 from delivery trucks in Table G-3.6, but not for any other construction equipment. (AFC, Appx. G.) Idling emissions were not estimated for other pollutants or any off-road heavy equipment, e.g., scrapers, dozers, even though significant idling occurs during construction as evidenced by the low use factors. Idling emissions can be estimated using factors published by the EPA,[7] those measured in the Colorado study, or estimated by the MOBILE5b and PART 5 models.

(a) Please revise the construction emission inventory to include idling emissions for all on-site and off-site construction equipment.

(b) Please provide the PM10 idling emission factor used for delivery trucks in Table G-3.6 and identify its source.

[7] U.S. EPA, Emission Facts: Idling Vehicle Emissions, Report EPA 420-F-98-014, April 1998.

35. Heavy equipment and machinery would be transported by rail whenever possible and cost effective. (AFC, p. 5.10-7.) Locomotive emissions are generally much higher than equivalent emissions from on-road vehicles due to differences in fuel composition and duty cycles, among others. The construction emission inventory does not contain any rail transport emissions. Please (a) identify all equipment or machinery that would be delivered by rail; (b) the number of rail trips that will be used (i) for delivery of all equipment and (ii) for other construction and operational needs of the project; and (c) revise the construction emission inventory to include rail emissions.

Background

The well flow run emissions in Table G-14 are presented with no support.

Data Request

36. Please provide the emission factors used to estimate well flow run emissions and any supporting data, including source tests and brine and steam composition data assumed in the emission calculations.

37. Please provide a sample calculation for PM10 for the column captioned "production single well (lbs/hr)."

38. Please provide a sample calculation for PM10 for the column captioned "production multiple wells (lbs/period)."

39. Please provide a sample calculation for PM10 for the column captioned "injection single well (lbs/hr)."

40. Please provide a sample calculation for PM10 for the column captioned "injection multiple wells (lbs/period)."

41. The well flow emissions are based on 286 hours per year of uncontrolled venting, consisting of 54 hours for redrilling injection wells, 48 hours for redrilling production wells, 40 hours

for warm starts, and 144 hours for coil tube cleanout. (AFC, p. 5.1-19.)

(a) Do these estimates include unscheduled outages? Please support your answer with outage data for the Salton Sea Units 1 through 5 over the past 5 years.

(b) Do these estimates include redrilling of the plant and condensate wells? (AFC, p. 5.1-18.)

42. Turning a geothermal well on or off is a major operation and risks damaging the wellbore and surface equipment. Thus, there is a strong incentive not to interrupt steam production during outages.

(a) Will the production wells be shut in during all outages?

(b) If the answer to subpart (a) is no, under what types of outage conditions would they continue to produce?

(c) If the answer to subpart (a) is no, please revise the well flow emissions in Table G-14 to include these emissions.

(d) If the answer to subpart (a) is yes, is the applicant willing to accept a COC that would prohibit steam venting during outages?

(e) If the applicant is not willing to accept a COC that would prohibit steam venting during outages, as requested in subpart (d) please (i) explain your reasons and (ii) provide all justification?

Background

The AFC includes well drilling combustion criteria pollutant emissions (Table 5.1-33) and well flow testing criteria and toxic pollutant emissions (Table G-4), but does not appear to include noncombustion emissions during the drilling process itself. Venting of a small amount of contaminated steam and noncondensible gases can occur during the drilling process itself.

Data Request

43. Please provide an estimate for these emissions, or provide all evidence you have to explain why they are excluded.

Background

The commissioning, startup, and operational emission calculations in Appendix G cannot be evaluated because the AFC does not include any chemical composition data on the various emission streams.

Data Request

44. Please provide chemical composition data for the following emission streams. The data should include criteria and toxic pollutants, as well as carbon dioxide.

    (a) Noncondensible gases that follow the flashing steam (AFC, p. 5.1-14)

    (b) Noncondensible gases that partition to the condensate (AFC, p. 5.1-5)

    (c) Cooling tower circulating water. Please include the contribution from chemicals added to control scale and biological growth.

45. Please explain how the composition data in Data Request # 45, subparts (a) to (c) was determined. If by engineering calculation, please provide a copy of all supporting data and a sample calculation. If from test data, please provide a copy of the test data.

Background

The criteria pollutant dispersion analyses appear to be incomplete and based on outdated information. California recently lowered the state 24-hour PM10 standard and promulgated a new PM2.5 standard. California also has a 24-hour SO_4 standard. The AFC does not include an analysis of these three standards. Further, the site is surrounded on three sides by existing geothermal facilities. These existing facilities should have been included in a cumulative impact analysis.

Data Request

46. Please expand the emission inventory and modeling analysis to include the following additional analyses:

    (a) Emissions and ambient air concentrations for SO_4. Please include the conversion of H_2S to SO_4 in your calculations.

    (b) Emissions and ambient air concentrations for PM2.5

    (c) Revised PM10 air quality impact analysis based on the recently revised California 24-hour PM10 AAQS

    (d) Cumulative air quality analysis that includes all existing facilities.

Background

The H_2S air quality analysis assumes a background H_2S level of 24.6 ug/m^3 for the region, based on an unidentified APCD assessment. (AFC, p. 5.1-8.)

Data Request

47. Please provide a reference and all data that supports a 24.6 ug/m^3 background H_2S level.

48. Please provide at least 1 year of recent ambient H_2S monitoring data from all H_2S monitors at the existing geothermal facilities.

Background

The Project would emit 2,681 ton/yr of ammonia from the cooling tower alone. (AFC, Table G-8.) Much of this ammonia would be converted into PM10 downwind of the site, reducing visibility. The AFC only considered one potential reaction pathway, the conversion of ambient NOx to nitrate, apparently by reaction with ozone. However, this ignores other secondary PM10 conversion pathways that are likely to be important at the site, thus substantially underestimating secondary PM10 and visibility impacts.

Data Request

49. Please respond to the following questions regarding the conversion pathways:

(a) The AFC, p. 5.1-44, claims that only 10% to 30% of the NOx is converted to nitrate based on "studies." Please identify all "studies" that support the range of 10% to 30%, and if not publicly available, provide copies.

(b) The AFC, p. 5.1-44, calculates the contribution of ammonia to secondary PM10 by using only the lower end of the range of 10% to 30% noted in subpart (a), because "the area is not considered a polluted environment."

i. Please clarify what you mean by "a polluted environment" and provide the chemical pathway that would be affected. Support your answer with any references to the literature or other evidence that you rely on.

ii. Please justify using only the lower end of the range of 10% to 30% for NOx to NO_3 conversion (10%) by citing any references to the literature or other evidence that you rely on and provide atmospheric composition data, e.g., OH, O_3 to justify your choice.

(c) Nitric acid vapor reacts reversibly with ammonia to form NH_4NO_3 particles.[8] This reaction was not considered in the secondary PM10 calculations in the AFC. Please revise the secondary PM10 calculations at page 5.1-44 to include the direct reaction of nitric acid vapor with ammonia or provide any evidence you rely on that shows that the reaction does not occur.

(d) The brine contains very high concentrations of NaCl, some of which will be emitted from the cooling tower and elsewhere. The emitted NaCl can react with HNO_3 in the plume and downwind in the atmosphere, forming nitrate, *viz.*, HNO_3 +

[8] A.G. Allen and others, Atmos. Environ., 1989, v. 23, pp. 1591-1599.

$NaCl \rightarrow NaNO_3 + HCl$.[9] Please revise the secondary PM10 calculations at page 5.1-44 to include the reaction of nitric acid vapor with NaCl or provide any evidence you rely on that shows that the reaction does not occur.

(e) The project would emit SO_2. Most of this SO_2 would be converted to sulfate, which could react with ammonia to form ammonia sulfate. Please revise the secondary PM10 calculations at page 5.1-44 to include this PM10 formation mechanism or provide any evidence you rely on that shows that the reaction does not occur.

(f) The project would emit H_2S, which would ultimately be converted to SO_2 and sulfate,[10] reacting with ammonia to form ammonia sulfate. Please revise the secondary PM10 calculations at page 5.1-44 to include this PM10 formation mechanism or provide any evidence you rely on that shows that the reaction does not occur.

Background

The visibility modeling in the AFC, Sec. 5.1.2.7.2, is based on a "domain average value of 10.0 ppb" for ammonia. (AFC, p. 5.1-41.) No support is provided for this choice. Please provide the following additional information required to assess the reasonableness of 10.0 ppb for background ammonia.

Data Request

50. Please explain the basis of the 10.0 ppb choice and provide chemical measurements, references to the literature, and any other evidence you have to support this value.

51. The project would emit very large amounts of ammonia. Do the visibility calculations include the contribution of the Project's ammonia emissions to the background ammonia value of 10.0 ppb?

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[9] C.J. Ottley and R.M. Harrison, Atmos. Environ., v. 26A, 1992, pp. 1689-1699.
[10] R.R. Friedl et al., J. Phys. Chem., v. 89, pp. 5505-5510.

52. If the answer to Data Request # 52 is no, please explain why not and provide any evidence you have to support your answer.

53. If the answer to Data Request # 52 is yes, please identify the Project's contribution and explain how it was calculated or supply electronic files that contain the dispersion model runs.

Background

The applicant is proposing to use a LO-CAT system to reduce H_2S by 99.5% and mercury by 90%, followed by carbon absorbers to reduce benzene by 95% in noncondensible gases. These two systems combined are estimated to reduce arsenic by 90%. The applicant is also proposing to use oxidizers to remove 95% of the H_2S in the noncondensible gases that partition to the condensate. (AFC, p. 5.1-15.) These control efficiencies were assumed in the emission calculations in Table G-6. The treated gases would be routed to the cooling tower, where any residual H_2S, benzene, arsenic, and mercury would be emitted. (AFC, Fig. 3.3-10D.)

Data Request

54. Please provide all source test data, including data from the existing Salton Sea Geothermal Units 1 through 5, which support these very high removal efficiencies.

55. Please provide the results of pilot plant tests (mentioned on p. 5.1-15) that support the claimed benzene removal efficiency and any of the other claimed removal efficiencies not otherwise supported by representative source test data.

56. The treated gases are routed to the cooling towers, which are quite difficult to monitor and thus are rarely source tested. How does the applicant propose to demonstrate initial and routine compliance with the removal efficiencies assumed in the emission calculations?

57. Please provide an MSDS for each of the additives required continuously to operate the LO-CAT system, as identified on page 3-21 of the AFC.

Background

During the site visit on November 19, 2002, steam plumes were observed emanating from several sources at the Elmore Plant that are not included in the emission inventory in the AFC for Salton Sea Unit 6. These include the Atmospheric Flash Tank, a vent on the clarifier, and a brine pond. The applicant indicated that the steam was "clean" and contained no noncondensible gases.

Data Request

58. Please support your conclusion that vented steam is clean and contains no noncondensible gases with a credible physical explanation, engineering calculations, and appropriate measurements.

59. Are there any other release points for steam? If yes, please identify each such release point, provide chemical composition data, and estimate emissions.

    (a) Figure 3.3-9 shows a vent on the Dilution Water Deaerator. Is this the same as the vent observed on the Atmospheric Flash Tank, or is it a separate vent?

    (b) Contaminated steam and/or noncondensible gases could be released at pumps, compressors, valves, and flanges throughout the facility, some which are shown on Figs. 3.3-9 to 3.3-10E. Please provide an inventory of fugitive components and emissions there from.

60. If no, will the applicant be willing to accept a COC that would prohibit any other release points for steam?

61. Has the applicant monitored, or is the applicant aware of any chemical monitoring data or studies on the vented steam plumes? If yes, please provide copies of all such data and/or studies.

WASTE MANAGEMENT

Background

The Project will generate 120 ton/day of filter cake. The AFC indicates that, based on the proposed design of the facility, this material would be classified as hazardous 5% of the time and nonhazardous 95% of the time. (AFC, p. 3-17.) The AFC does not contain sufficient information to confirm this classification or to evaluate the potential impacts of handling, transporting, and disposing of filter cake. Please provide the following additional information, required to evaluate the impacts of filter cake processing and disposal.

Data Request

62. Please provide the results of a Toxicity Characteristic Leaching Procedure ("TCLP") on a representative sample of filter cake.

63. Please provide a copy of the Material Safety Data Sheet ("MSDS") on filter cake.

64. The estimated chemical composition data for filter cake is presented in Table 3.3-6. Please present engineering calculations showing how these values were estimated and identify all underlying assumptions.

65. Wastes like filter cake are generally tested prior to disposal. Please provide filter cake TCLP and solids analyses for the previous 1 year for each of the existing geothermal units in the Salton Sea area.

66. Please summarize the relative amount of filter cake that was disposed as hazardous and nonhazardous waste from each of the existing geothermal units in the Salton Sea area over the past 5 years.

67. We understand that historically filter cake from existing geothermal units was used to construct berms and roads in the Salton Sea area. Please provide the following information on these practices:

(a) Were the berms and roads bordering the Salton Sea Unit 6 Project site constructed from filter cake or do they contain any filter cake? Please provide all information supporting your answer.

(b) Please identify all of the landfill(s) historically used to dispose of filter cake from the existing geothermal units in the Salton Sea area.

(c) Please identify all regulatory agencies that are aware of and have investigated the historical filter cake disposal practices from the existing geothermal units in the Salton Sea area.

68. Please explain the basis of the assumed 95% nonhazardous 5% hazardous split for filter cake. Please support your answer with all engineering calculations, historic data, and chemical composition data and identify all assumptions that you rely on.

69. If the 95%/5% split differs from historic practices, please detail all changes in engineering design, processing and/or disposal that the applicant believes would now allow the production of a 95% nonhazardous filter cake. Please support your answer by pilot plant or other operating data and engineering calculations.

70. The disposal of filter cake would require at least one and perhaps more daily truck trips. These trips are not acknowledged in the traffic and transportation section of the AFC. Filter cake is radioactive and contains high levels of arsenic and other metals. (AFC, Table 3.3-6.) An accident could result in significant public health impacts. Thus, please provide an analysis of the impacts of an accident involving a filter-cake truck, or, alternatively, provide the information required to prepare such an analysis, e.g., number and type of trucks per day, destination, and route.

71. During the site visit on November 19, 2002, the applicant indicated that filter cake will be disposed at a "monofill," a landfill owned by the applicant that only accepts filter cake.

(a) Please describe the procedures that will be used at this monofill to dispose of filter cake as a hazardous and a nonhazardous waste.

Background

Historically, scale formation within project facilities has been a major problem in the Salton Sea area. The AFC does not identify wastes from scale removal.

Data Request

72. Will scale deposition occur at Salton Sea 6?

73. If the answer to Data Request # 72 is yes, please complete the following:

    (a) Estimate the amount and chemical composition of the scale wastes;

    (b) Provide evidence to support your estimates of the amount and chemical composition of the scale wastes; and

    (c) Explain how scale wastes will be removed and handled.

74. If the answer to Data Request # 72 is no, please complete the following:

    (a) Describe the changes in processing that have been implemented to eliminate scale formation; and

    (b) Provide all evidence to support your answer in subpart (a).

WATER RESOURCES

Background

The AFC indicates that only 2,500 gallons per day or 2 acre-feet per year of water would be used for dust control and other construction related activities. This is not enough water to achieve the 80% control efficiency assumed in the air emission calculations, based on the following equation from a 1988 EPA report:[11]

$$C = 100 - 0.8pdt/i$$

and site specific values for the potential evaporation rate (p, mm/hr), average hourly daytime traffic rate (d, vehicles/hr), time between watering applications (t, hrs/application), and application intensity (i, L/m^2).

Data Request

75. Please provide site-specific value estimates for the potential evaporation (p), average hourly daytime traffic (d), time between watering applications (t), and application intensity (i) for use in the above equation.

76. Please provide all information that supports the proposition that 80% dust control can be achieved by applying only 2,500 gallons per day.

Background

The AFC indicates that freshwater water demand is based on the assumed salinity of the geothermal brine. The Project would ordinarily use about 293 acre feet per year ("afy") of IID canal water, based on an assumed brine salinity of 23.5%. However, "in the very unlikely event that the salinity reaches the maximum of 25.0%, the corresponding water demand could reach 987 afy." (AFC, p. 5.4-8.)

During the informational hearing on November 19, 2002, the applicant indicated that re-injected brine would return as produced water 7 to 10 years after injection. However, only about 75% of the produced brine is

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[11] C. Cowherd, G.E. Muleski, and J.S. Kinsey, Control of Open Fugitive Dust Sources, Report EPA-450/3-88-008, September 1988.

reinjected.[12] (AFC, Fig. 3.3-9.) The balance of the brine is evaporated, concentrating salts in the injected brine compared to the produced brine. Therefore, the TDS of the geothermal resource will gradually increase over time, resulting in an increase in water demand over the life of the Project.

Data Request

77. Does the upper limit of 25% include recognition of the gradual increase in brine TDS?

78. If the answer to Data Request # 77 is yes, please provide (a) an engineering calculation and (b) all evidence, data and references to literature you have to support your answer.

79. If the answer to Data Request # 77 is no, please (a) estimate the brine salinity at the end of the Project life, assumed to be 20-30 years, due to injection of a concentrated brine stream and (b) provide all justification you have for your estimate.

80. The applicant indicated during the November 19, 2002 site visit that brine salinity is routinely analyzed to evaluate brine quality. Thus, if not provided in response to Data Requests # 77 - 79, please provide brine salinity data from at least three nearby existing producing geothermal wells that support an average brine TDS of 23.5% and an upper limit on brine TDS of 25%.

81. Is the applicant aware of any changes in brine quality in the Salton Sea KGRA?

82. If the answer to Data Request # 81 is yes, please (a) identify the parameters that have changed and the cause(s) of the changes and (b) provide all data supporting your answer.

83. If the answer to Data Request # 81 is no, please provide all justification that supports the no change conclusion.

[12] From Figure 3.3-9: (52 + 9,600-69 kpph) / (12,768 kpph) = 0.75.

Background

The AFC assumes that the Project would result in a savings of about 572 afy of IID irrigation water, assuming that 173 acres of irrigated land currently using about 5 ac-ft/ac of water is taken out of production. (AFC, p. 5.4-8.) The AFC's estimates of both land taken out of production and consumptive water use are not supported and appear high. California Department of Water Resources studies,[13] for example, suggest lower consumptive water use for crops we observed growing in the area. Thus, additional information is needed to support the water savings analysis in the AFC.

Data Request

84. Please provide all information that supports an annual average consumptive water demand of 5 ac-ft/ac of water for the crops historically grown on lands that would be taken out of agricultural production by the Project. Your response should include IID irrigation water delivery data and annual cropping patterns.

85. Please support the estimate of 173 acres of fallowed land. Your answer should include a land use map that overlays areas that would be disturbed by the Project on lands that are currently and have historically been irrigated with IID water.

86. The Agriculture and Soils section of the AFC indicates that only 97 acres would be taken out of production (AFC, p. 5.3-12) while the Water Resources section assumes that 173 acres would be taken out of production. (AFC, p. 5.4-8.) Please reconcile these two estimates.

Background

The Water Supply Agreement ("Agreement") in Attachment 1 to Section 5.4 of the AFC indicates that the IID supply is not a firm supply. The Agreement, for example, notes that the Project may only take water at a rate that will not "unreasonably deplete the supply available in the canal for other uses." (Agreement, §4.1). Elsewhere, the Agreement allows the IID to reduce the maximum use amount, depending upon availability from the Colorado

[13] California Department of Water Resources, Crop Water Use in California, April 1986, Table J-4.

River. (Agreement, §4.3.) The Colorado River supply is not firm and depends, in part, upon demand by Upper Basin states. The AFC does not identify a backup supply or discuss any of the potential water supply impacts. Finally, the AFC does not evaluate the impact of using up to 1,000 afy of Colorado River water. Additional information is needed to estimate water supply impacts.

Data Request

87. Please identify a backup supply if sections 4.1 and 4.3 of the Agreement result in curtailment of the Project's primary supply. Your analysis should include an evaluation of irrigation tail water as a backup supply.

88. Please evaluate the impacts of using the backup supply(ies) identified in Data Request # 87.

89. Please provide copies of IID's contracts for Colorado River and any other water that would be supplied to the Project.

90. The Agreement provides up to 1,000 afy of IID water while the AFC's analysis is based on the use of an average of 293 AFC, resulting in net reduction in demand, up to a maximum of 987 afy.

    (a) Please resolve the discrepancy between the Agreement (1,000 afy) and the AFC's analysis (avg. 293 afy, max 987 afy).

    (b) Please evaluate the impact of using up to 1,000 afy of IID water for cooling and other process uses.

91. The Salton Sea has a history of water quality issues associated with increasing salinity and nutrient concentrations. (AFC, p. 5.4-5.) The Project would use up to 1,000 afy of irrigation water, a portion of which would have flowed into Salton Sea. Therefore, the Project will increase salinity and nutrient concentrations around the shore of the Sea. Please analyze the water quality impacts of removing up to 1,000 afy of water from the Salton Sea.

Background

The Project will require a waste discharge permit for the brine pond. The AFC only suggests that a waste discharge permit "may" be required and fails to identify for what or include the permit application, as is typical. (AFC, p. 5.4-15.) We understand that similar brine ponds at other existing units have failed and released contaminants.

Data Request

92. Please provide a copy of the application for a waste discharge permit for SSU6.

93. Please summarize historic releases over the past 5 years from other similar brine ponds at existing units 1 - 5. For each release, please provide the date of the release, the cause of the release, the size of the release, the composition of released fluids, the consequences of the release, actions taken to cleanup the release, and change(s) made in pond design and operation to prevent similar future releases.

94. Have any design features been incorporated into the SSU6 brine ponds that distinguish them from existing brine ponds? If yes, please identify these features.

Background

The Project will produce 12,768 kpph of brine and reinject 9,600 kpph of clarified brine. (AFC, Fig. 3.3-9.) This brine will be routed through a network of about 4 miles of pipelines (AFC, pp. 3-8, 3-11), which will be located along existing roadways and fields, where possible. (AFC, p. 3-37.) A release from these pipelines, due to seismic activity, or an accident with farm and other vehicles, could contaminate local soils, groundwaters, irrigation supplies, nearby marshes, or the Salton Sea itself. The AFC acknowledges that a release "would have the potential to impact shallow ground water or nearby surface waters." (AFC, pp. 5.4-10/11), but did not quantitatively analyze a brine pipeline release.

Data Request

95. Please summarize historic pipeline releases over the past 10 years. For each release, please identify the date of the release, the amount of fluid released, the cause of the release, the environmental consequences of the release, the steps taken to cleanup the release, and any changes in design that were implemented to prevent similar future releases.

96. Please provide an analysis of the impact of a production and injection pipeline release on local soils, irrigation supplies, shallow groundwater, nearby wetland and other habitat, and the Salton Sea.

97. The AFC indicates that mitigation for a potential release include a protective pipeline design, a detailed inspection routine, preparation of a release response plan, and expeditious containment, control, and cleanup of released liquids." (AFC, p. 5.4-11.)

    (a) Please identify all features of the pipeline that would mitigate a release.

    (b) Please provide a copy of the detailed inspection routine.

    (c) Please provide a copy of the containment, control, and cleanup procedures.

98. Would the applicant be willing to incorporate additional design features not identified in subpart (98) to collect any released fluids, such as use of double-walled pipeline or a trough or sump beneath the pipelines to collect any released fluids? If no, please explain why not.